Space Weather Forecast

Issued on Wednesday, 25 January 2023 at 12:50 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Reducing risk of R1/R2 Radio Blackouts. Slight chance of G1/Minor Geomagnetic Storms on Day 2 (26th).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Moderate over the past 24 hours, with one Moderate-class X-ray observed, a Moderate-class event from the vicinity of sunspot regions in the far west of the visible disc at 25/1010 UTC. There are currently eight numbered sunspot regions and three unnumbered sunspot group on the visible disc. By far the largest region is the sunspot group in the far southwest, with moderate complexity, although the leading portion has decayed somewhat in recent hours. The region should reach the western limb at the end of the UTC day on Day 1 (25th).

All other regions appear generally small or stable, with little significant change observed, though a small spot near the centre northern disk remains more magnetically complex.

There are currently numerous 'filaments' (arcs of plasma) on the Sun, with most of these concentrated near the western horizon in both hemispheres, which is of note as they could be triggered by the more active sunspots here should they flare appropriately. This appears to occurred with the Common-class flare from the region in the far northwest starting around 24/1400 UTC, which released a moderately-large filament and associated Coronal Mass Ejection (CME), but is not Earth-directed.

No other possible Earth directed CMEs have detected in available imagery.

Solar Wind / Geomagnetic Activity: Solar winds have been at slightly elevated levels 450km/s, reducing down to background (around 380-400km/s) at times. The Interplanetary Magnetic Field strength has been weak throughout, as has the important north-southwards component of the magnetic field. Resultant Geomagnetic activity was Quiet (0-2 Kp).

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is expected to be generally Low, with a daily but reducing chance of becoming Moderate, as the most potent regions in the far west of the visible disc rotate off to become far-sided by the end of Day 2 (26th). New regions likely rotating over the eastern limb in the coming days however, helping to maintain a chance of Moderate-Class flares.

Solar Wind / Geomagnetic Activity: The geomagnetic forecast is of lower than average confidence for the period. The likelihood of any CMEs (coronal mass ejections) affecting Earth during the period is low.

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Two high-speed streams from coronal holes are anticipated to arrive at Earth on Day 2 (26th) and Day 3/4 (27/28th). The effects from both are expected to be relatively muted overall.

Geomagnetic activity is forecast to be Quiet through much of Day 1 (25th), perhaps increasing to Unsettled late in the UTC day and likely Unsettled by early Day 2, with the risk of Active intervals and a slight chance of G1/Minor Storm conditions. Thereafter, activity reducing to mainly Quiet to Unsettled, with a very slight chance of a G1/Minor Storm interval between Days 3 and 4.

Energetic Particles / Solar Radiation: Solar radiation storms continue to carry a daily slight chance of reaching S1 or greater through the period, beginning to abate into the coming UTC weekend.

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Met Office Space Weather Forecast

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	20	10	10
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	50	40	30	30
Very Active	R3 to R5 X	No	5	3	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	15	15	10	10
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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